

REMARKS

Claims 1, 3-16 and 18-21 are pending in this application.

I. Rejection Under 35 U.S.C. §102/103

Claims 1, 3-16 and 18-21 are rejected under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as having been obvious over U.S. Patent No. 5,688,876 to Ando et al. ("Ando"). Applicants respectfully traverse the rejection for at least the following reasons.

A. Claim 1

Claim 1 is directed to a Mannich base prepared by using at least one phenolic compound of formula (I), a formaldehyde and at least one polyamine. The specification defines a polyamine as a compound having two or more primary amino groups. See specification at paragraph [0010]. Ando does not disclose and would not have rendered obvious these claimed features for at least the following reasons.

Ando discloses a Mannich base prepared from a phenolic compound, a carbonyl compound and an amino compound (II-③). Ando further teaches that the amino compounds are limited to dimethylaminopropylamine, diethylaminopropylamine, dibutylaminopropylamine and dimethylaminoethylamine, and mixtures thereof. See col. 13, lines 7-13. Such amino compounds of Ando are not polyamines as defined by the specification but, rather, are tertiary amines. Thus, Ando does not disclose a Mannich base prepared by using at least one polyamine.

Furthermore, Ando does not disclose a polyamine that is chemically bound to the Mannich molecule. As discussed above, the claimed Mannich base is prepared by using at least one polyamine and, thus, the polyamine becomes a part of the Mannich base by chemically bonding to the Mannich molecule. Polyamines are an important part of epoxy resins because they have a high number of primary groups capable of reacting with an epoxy

in order to yield excellent hardeners. See specification at paragraph [0047]. Although Mannich bases prepared from aldehydes, phenols and polyamines produce high viscous epoxy resins due to the formation of oligomeres that react with the primary amino groups, the claimed Mannich base provides highly reactive Mannich bases that are also low in viscosity because the polyamine is a part of the Mannich molecule.

In contrast, Ando uses a polyamine as an additive of the hardener, and not as a part of the Mannich molecule. As discussed above, Ando teaches a Mannich base prepared from a phenolic compound, a carbonyl compound and an amino compound (II-③), which is not a polyamine. Instead, as a part of the Mannich base, the amino group of the amino compound (II-③) converts into a secondary amino group. In other words, the Mannich base of Ando only consists of secondary and tertiary amine sites that do not react and, at most, react slowly with the epoxy. Ando further teaches that separate active amino compounds (IV), which are polyamines, are used as a curing agent for the epoxy resin. See col. 13, lines 43-47. Thus, Ando discloses polyamines used as an additive and does not disclose polyamines that are a part of the Mannich molecule.

Additionally, the claimed Mannich base is prepared by using at least one phenolic compound of the formula (I), such as 3,5-xyleneol (claim 6). Ando discloses a broad range of phenolic compounds used to produce a Mannich base for its epoxy resin. See col. 12, lines 20-25. Thus, Ando does not specifically disclose 3,5-xyleneol (claim 6).

Therefore, Ando does not disclose and would not have rendered obvious a Mannich base prepared by at least one polyamine and the specific phenolic compounds of formula (I) in order to form a high monomer content and fast curing Mannich base having low viscosity.

B. Claim 9

Claim 9 is directed to a method of producing a Mannich base that requires "reacting at least one phenolic compound with formaldehyde in the presence of a tertiary amine; and

reacting a resulting product with at least one polyamine." Ando does not disclose and would not have rendered obvious the claimed method. Similar to the reasons provided above with respect to claim 1, the amino compound (II-③) of Ando does not fall within the definition of a polyamine in the specification because the amino compound of Ando does not have two or more primary amino groups. Thus, Ando does not disclose and would not have rendered obvious a Mannich base that is produced by reacting at least one polyamine.

C. Conclusion


For at least these reasons, Ando does not anticipate and would not have rendered obvious claims 1 and 9. Claims 3-8, 10-16, and 18-21 variously depend from claims 1 and 9 and, thus, also are not anticipated and would not have been rendered obvious by Ando for at least the same reasons. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

II. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the claims are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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